

Product: WHEEL SKIDDER

Model: 545D WHEEL SKIDDER KGP

Configuration: 545D WHEEL SKIDDER KGP00001-UP (MACHINE) POWERED BY C7.1 Engine

Disassembly and Assembly

C7.1 Engines for Caterpillar Built Machines

Media Number -UENR4468-15

Publication Date -01/06/2015

Date Updated -30/10/2018

i05018649

Gear Group (Front) - Remove and Install

SMCS - 1206-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A ⁽¹⁾	9U-6198	Crankshaft Turning Tool	1
A ⁽²⁾	9U-7336	Housing	1
	5P-7305	Engine Turning Tool	1
B	230-6284	Timing Pin (Camshaft)	1
C	364-9107	Fuel Injection Pump Timing Pin	1
D	136-4632	Timing Pin (Crankshaft)	1
	268-1966	Adapter	1
E	298-5564	T40 Torx Socket	1

⁽¹⁾ The Crankshaft Turning Tool is used on the front pulley.

⁽²⁾ This Tool is used in the aperture for the electric starting motor.

Start By:

- Remove the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install" for the correct procedure.
 - Remove the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install" for the correct procedure.
-

NOTICE

Keep all parts clean from contaminants.

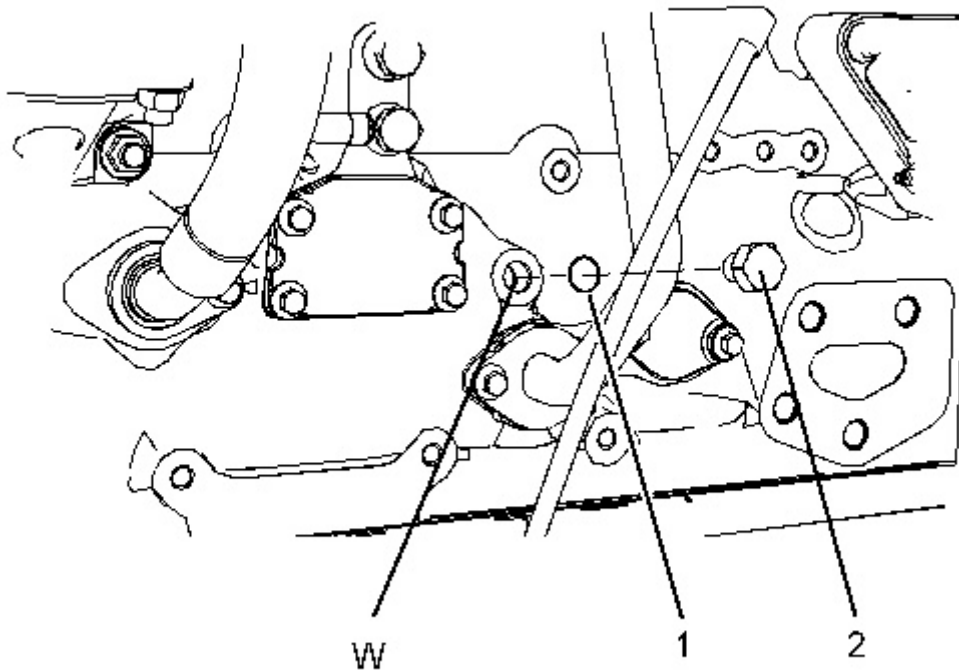
Contaminants may cause rapid wear and shortened component life.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

Note: Either Tooling (A) can be used. Use the Tooling that is most suitable. Care must be taken in order to ensure that the fuel injection pump timing is not lost during the removal of the front gear group. Carefully follow the procedure in order to remove the gear group.



1. Remove plug (2) from the cylinder block. Remove O-ring seal (1) from the plug.
 2. Use Tooling (A) in order to rotate the crankshaft so that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.
 3. Install Tooling (D) through Hole (W) in order to lock the crankshaft.
 4. Remove Tooling (D).
 5. Use Tooling (A) in order to rotate the crankshaft in a clockwise direction and position the crankshaft at 60 degrees after top dead center.
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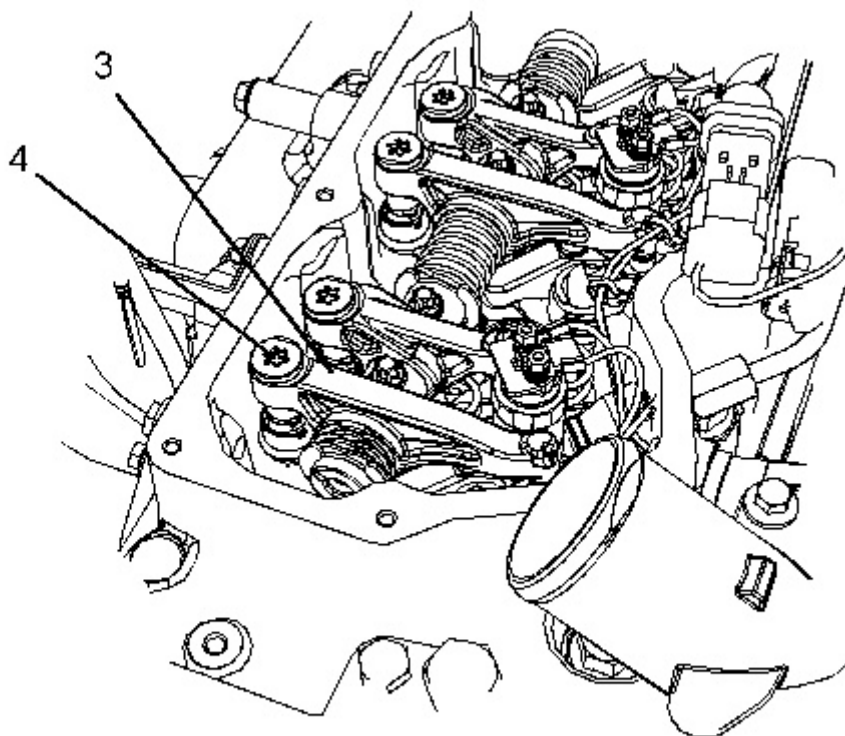


Illustration 2

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6. Use Tooling (E) in order to loosen threaded inserts (4) on all rocker arms (3). Unscrew threaded inserts (4) on all rocker arms (3) until all valves are fully closed.

Note: Ensure that ALL threaded inserts are fully unscrewed.

7. Use Tooling (A) in order to rotate the crankshaft so that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.
8. Install Tooling (D) through Hole (W) in order to lock the crankshaft. Refer to Illustration 1.

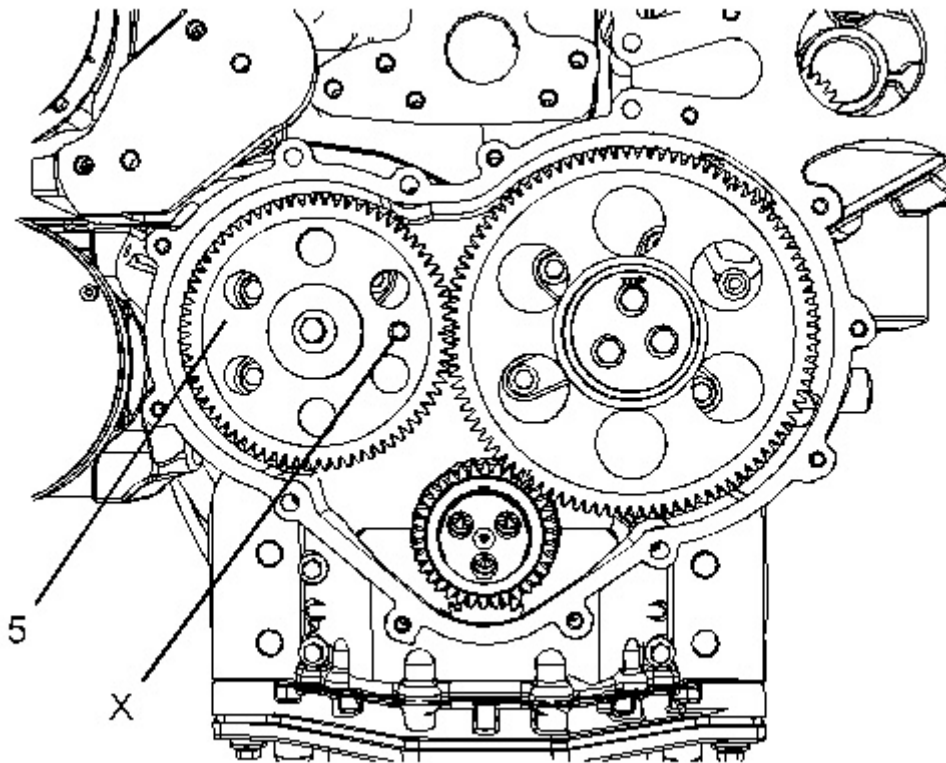


Illustration 3

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9. Install Tooling (B) through Hole (X) in camshaft gear (5) into the front housing. Use Tooling (B) in order to lock the camshaft in the correct position. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.
 10. Install Tooling (D) into Hole (W) in the cylinder block. Use Tooling (D) in order to lock the crankshaft in the correct position. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.
- Note:** Do not use excessive force to install Tooling (D). Do not use Tooling (D) to hold the crankshaft during repairs.
11. Use Tooling (C) in order to lock the fuel injection pump gear in the correct position. Refer to Disassembly and Assembly, "Fuel Injection Pump - Remove" for the correct procedure.

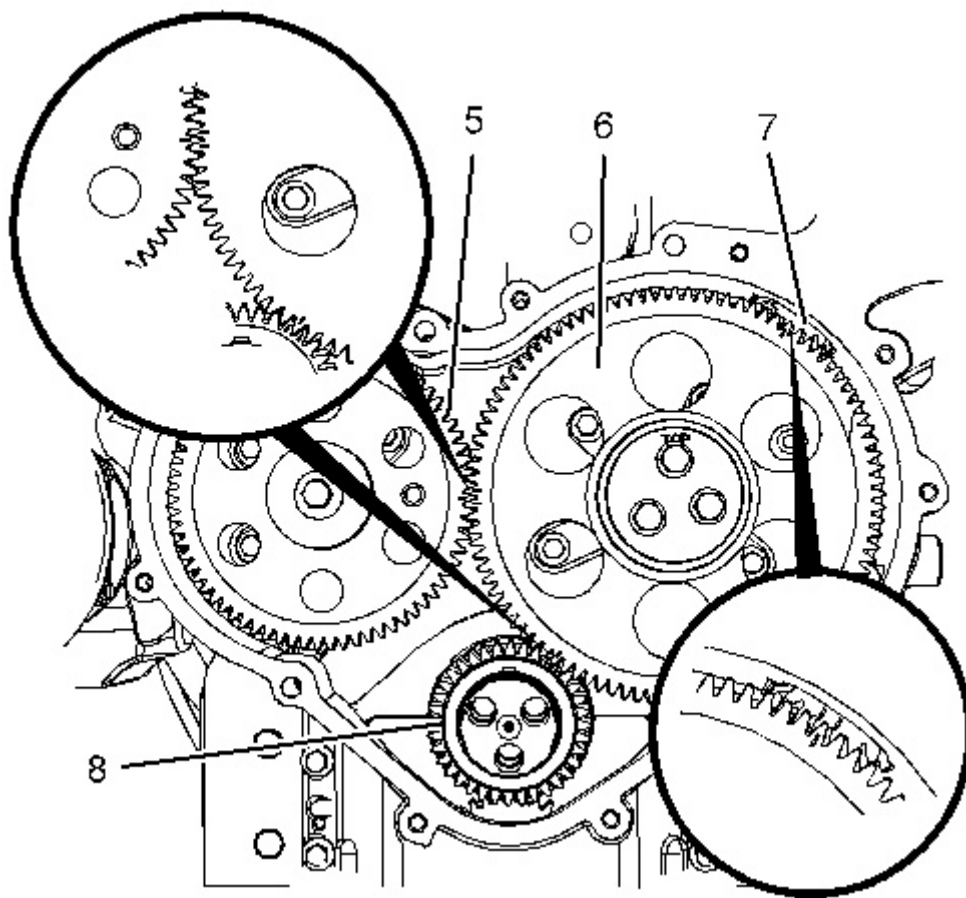


Illustration 4

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12. Mark gear (5), gear (6), gear (7), and gear (8) in order to show alignment. Refer to Illustration 4.

Note: Identification will ensure that the gears can be installed in the original alignment.

13. Remove Tooling (B), Tooling (C), and Tooling (D).
14. Remove camshaft gear (5). Refer to Disassembly and Assembly, "Camshaft Gear - Remove and Install" for the correct procedure.
15. Remove idler gear (6). Refer to Disassembly and Assembly, "Idler Gear - Remove and Install" for the correct procedure.

Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
B	230-6284	Timing Pin (Camshaft)	1
C	364-9107	Fuel Injection Pump Timing Pin	1
D	136-4632	Timing Pin (Crankshaft)	1

	268-1966	Adapter	1
E	298-5564	T40 Torx Socket	1
F	7H-1942	Dial Indicator	1
	-	Magnetic Base and Stand	1

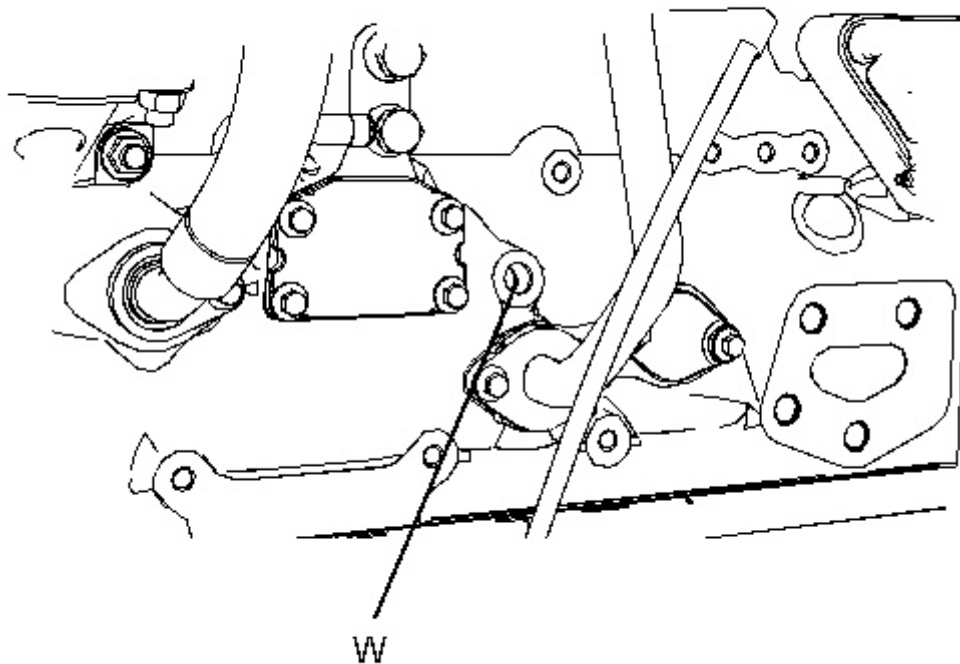
NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: The fuel injection pump must remain locked until the procedure instructs you to unlock the fuel injection pump.

1. Ensure that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center for No. 1 Piston" for the correct procedure.



2. If necessary, install Tooling (D) into Hole (W) in the cylinder block. Use Tooling (D) in order to lock the crankshaft in the correct position. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.

Note: Do not use excessive force to install Tooling (D). Do not use Tooling (D) to hold the crankshaft during repairs.

3. Ensure that all of the components of the front gear group are clean and free from wear and damage. If necessary, replace any components that are worn or damaged.

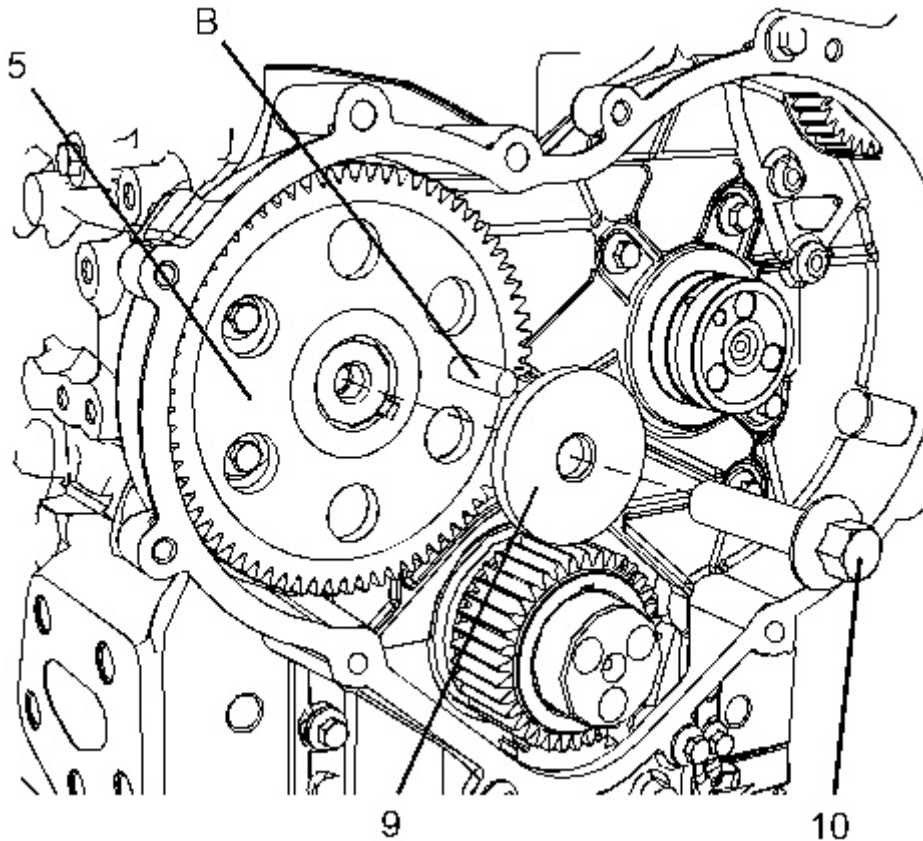


Illustration 6

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4. Install camshaft gear (5). Loosely install bolt (10) and washer (9) for the camshaft gear. Refer to Disassembly and Assembly, "Camshaft Gear - Remove and Install" for the correct procedure.

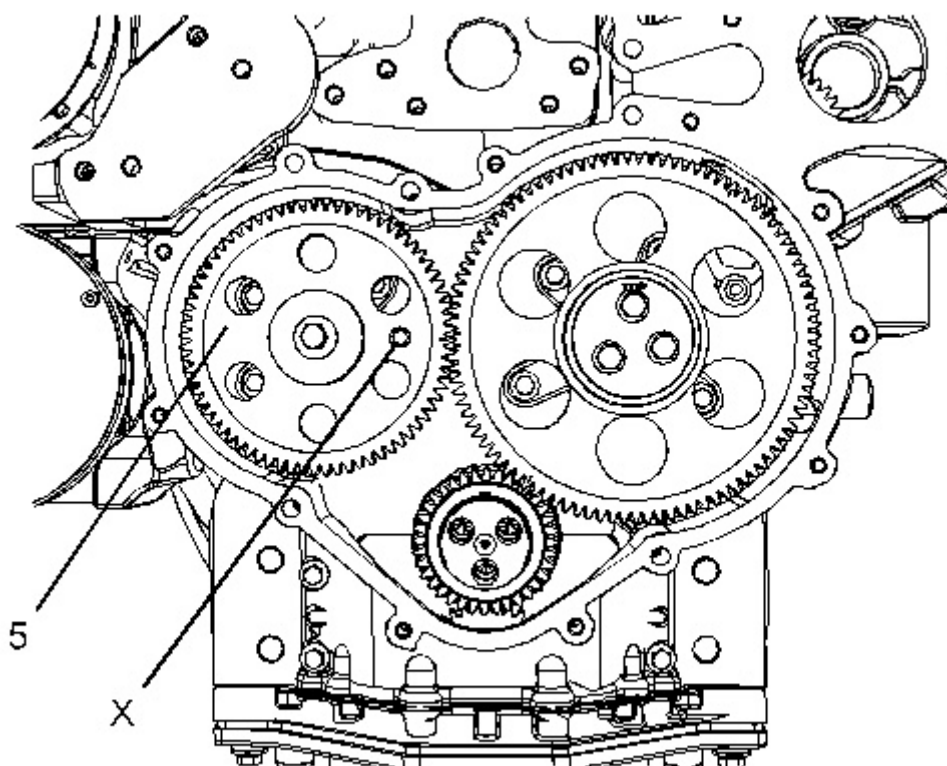


Illustration 7

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5. Install Tooling (B) through Hole (X) in camshaft gear (5) into the front housing.
-

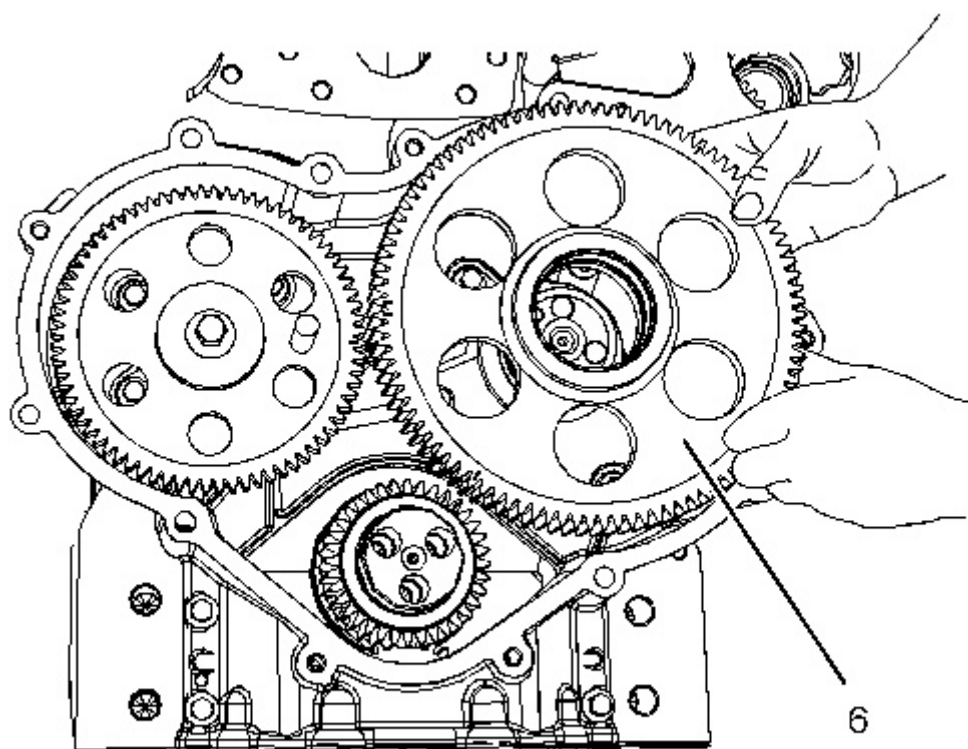


Illustration 8

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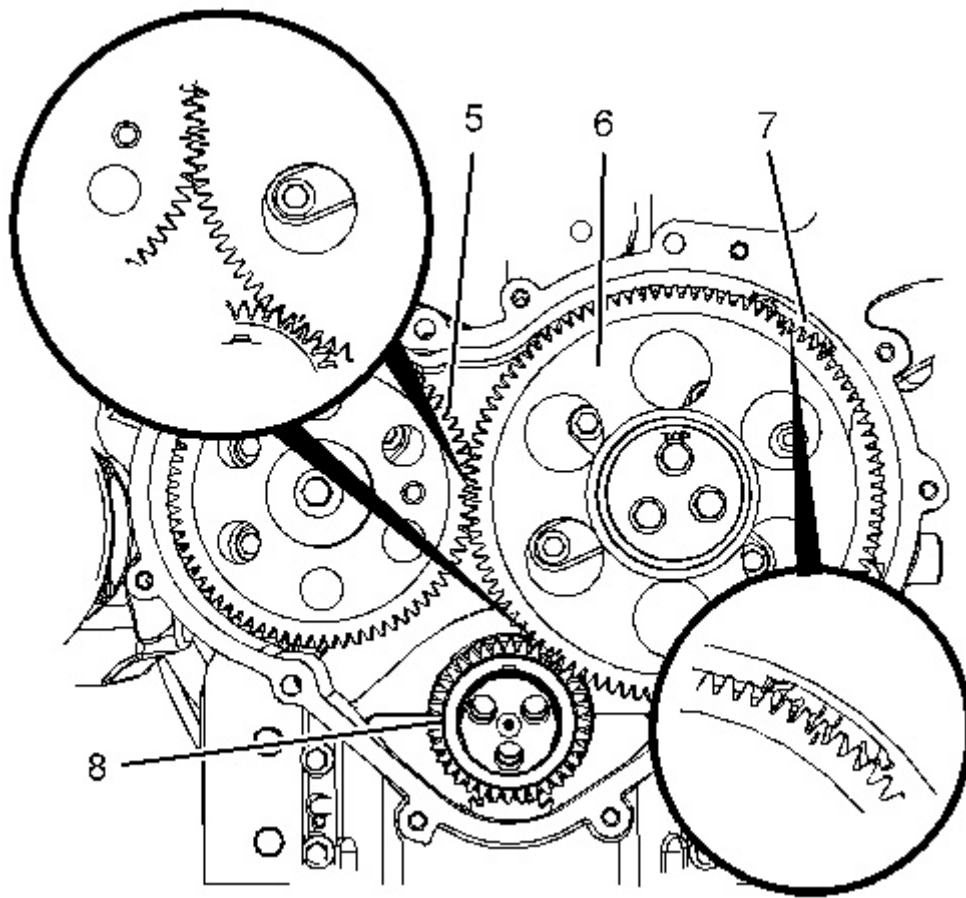


Illustration 9

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Alignment of timing marks

6. Install idler gear (6). Ensure that the timing marks on gear (5), gear (5), gear (7), and gear (8) are in alignment. Refer to Disassembly and Assembly, "Idler Gear - Remove and Install". Check the end play of the idler gear. Refer to Specifications, "Gear Group (Front)" and refer to Disassembly and Assembly, "Idler Gear - Remove and Install" for the correct procedure.

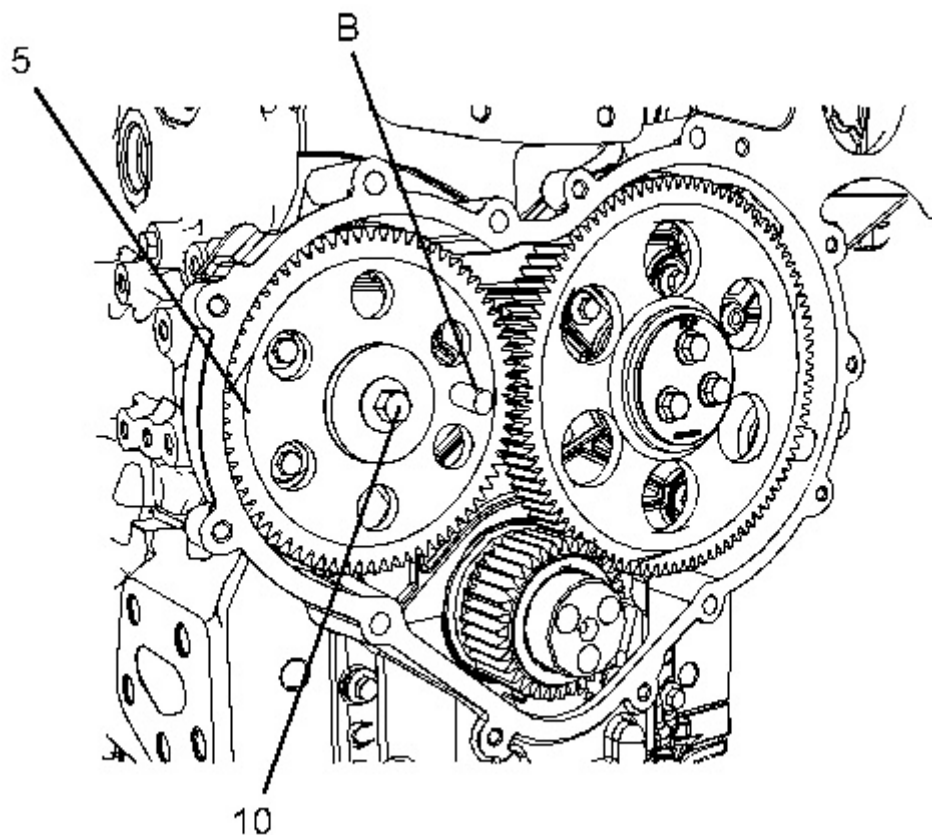


Illustration 10

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7. Ensure that the fuel injection pump is locked in the correct position. Refer to Disassembly and Assembly, "Fuel Injection Pump - Install" for the correct procedure.
8. Remove Tooling (B) and Tooling (C).

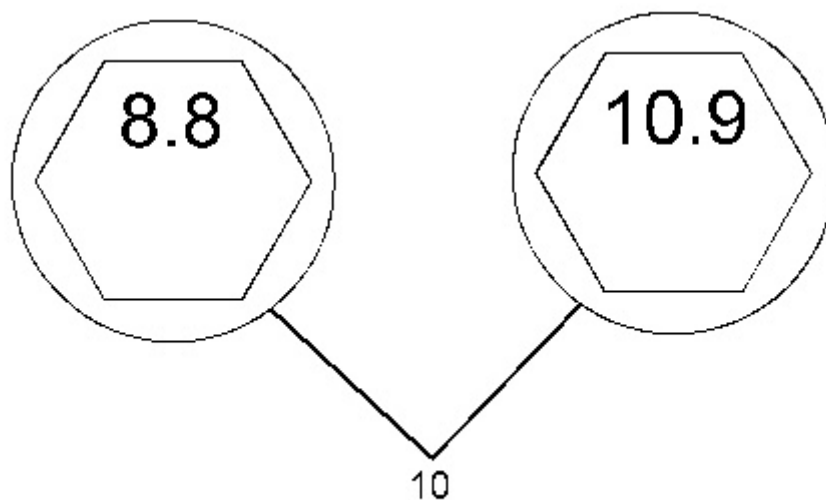


Illustration 11

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9. When a 8.8 Graded bolt (10) is installed. Tighten the bolt to a torque of 95 N·m (70 lb ft).

When a 10.9 Graded bolt (10) is installed. Tighten the bolt to a torque of 120 N·m (89 lb ft).

10. Check the end play of the camshaft gear. Refer to Specifications, "Camshaft" for more information.
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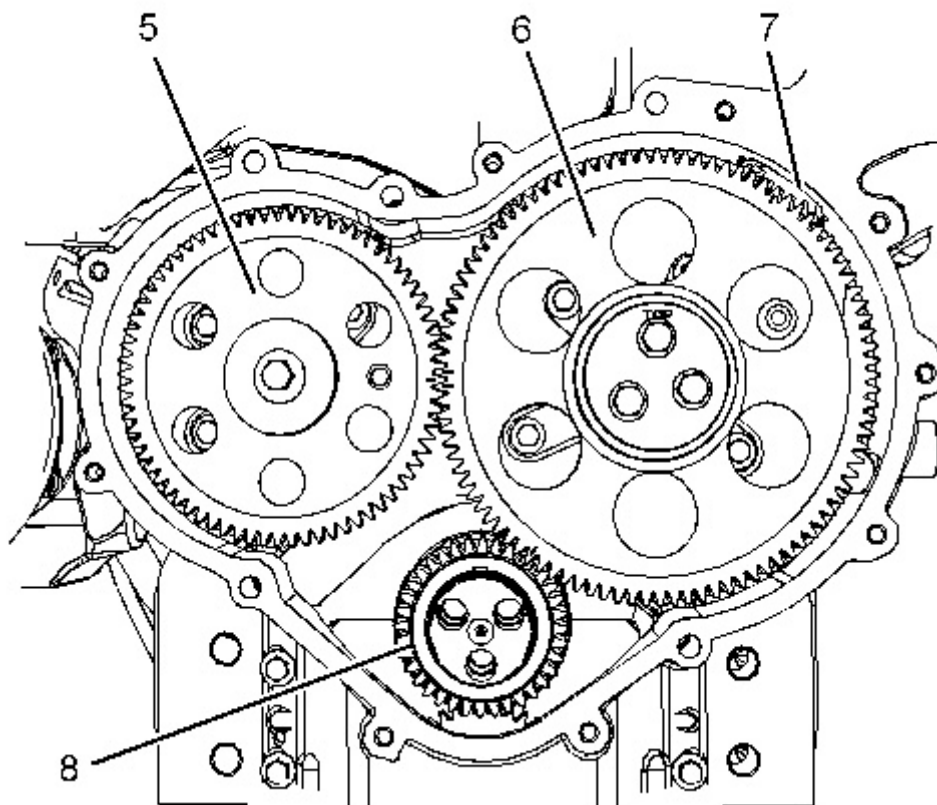


Illustration 12

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11. Use Tooling (F) in order to measure the backlash for gear (5), gear (6), gear (7), and gear (8). Refer to Specifications, "Gear Group (Front)" for more information.
12. Lubricate each gear with clean lubricating engine oil.
13. If necessary, use Tooling (A) in order to rotate the crankshaft so that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure. If necessary, use Tooling (D) in order to lock the crankshaft so that number one piston is at top dead center on the compression stroke.
14. Remove Tooling (D).
-

NOTICE

Failure to ensure that the crankshaft is positioned at 60 degrees after top dead center will result in interference between the pistons and the valves. Interference between the pistons and the valves will result in damage to the engine.

15. Use Tooling (A) in order to rotate the crankshaft in a clockwise direction and position the crankshaft at 60 degrees after top dead center.
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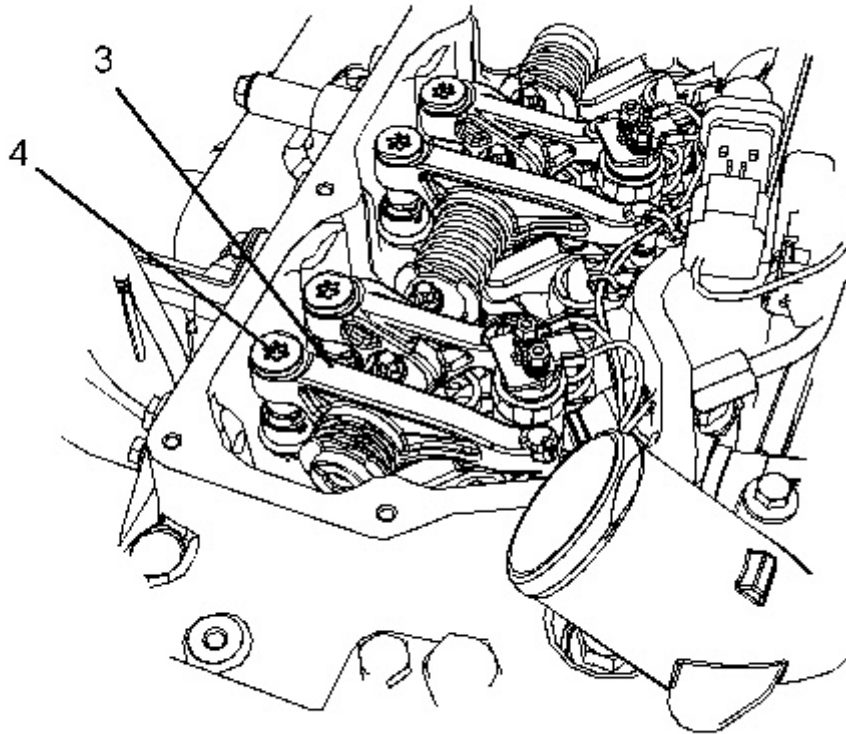


Illustration 13

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16. Use Tooling (E) in order to tighten threaded inserts (4) on all rocker arms (3). Tighten the threaded inserts to a torque of 30 N·m (265 lb in).

Note: When the threaded insert is tightened, the threaded insert must be seated correctly into the cup for the pushrod.

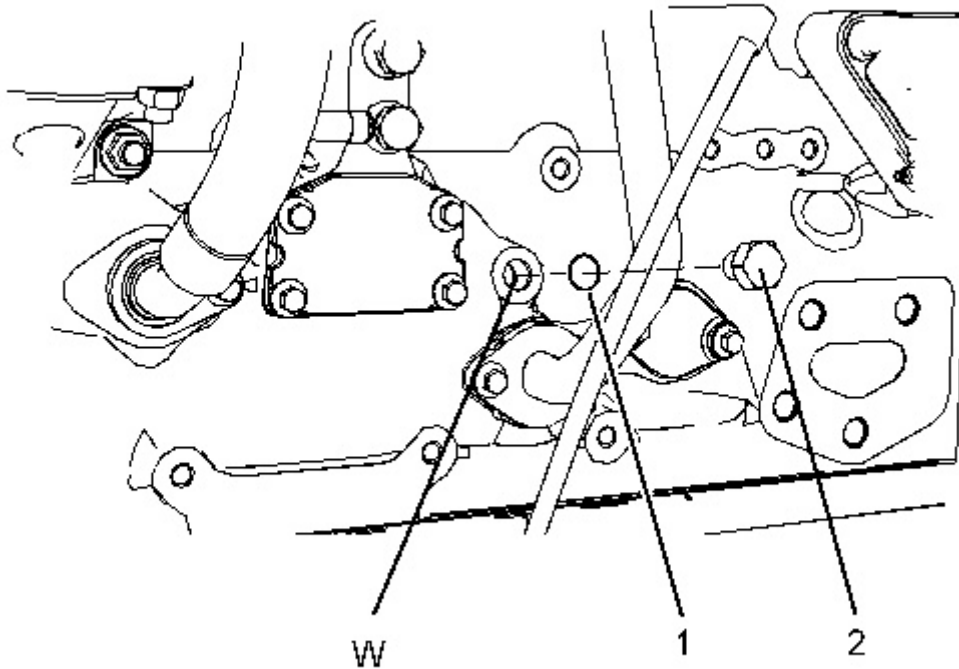


Illustration 14

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17. Install a new O-ring seal (1) to plug (2). Install the plug into Hole (W) in the cylinder block. Tighten plug (2) to a torque of 21 N·m (186 lb in).
18. The engine should not be operated for a period 30 minutes after the threaded inserts on all the rocker arms have been tightened. This period will allow the force from the valve springs to purge off excessive engine oil from the hydraulic lifters.

End By:

- a. Install the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install" for the correct procedure.
 - b. Install the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install" for the correct procedure.
-

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Configuration: 545D WHEEL SKIDDER KGP00001-UP (MACHINE) POWERED BY C7.1 Engine

Disassembly and Assembly

C7.1 Engines for Caterpillar Built Machines

Media Number -UENR4468-15

Publication Date -01/06/2015

Date Updated -30/10/2018

i05018651

Gear Group (Front) - Remove and Install - Heavy Duty Gear Group (Front)

SMCS - 1206-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A ⁽¹⁾	9U-6198	Crankshaft Turning Tool	1
A ⁽²⁾	9U-7336	Housing	1
	5P-7305	Engine Turning Tool	1
B	230-6284	Timing Pin (Camshaft)	1
C	364-9107	Fuel Injection Pump Timing Pin	1
D	136-4632	Timing Pin (Crankshaft)	1
	268-1966	Adapter	1
E	298-5564	T40 Torx Socket	1

⁽¹⁾ The Crankshaft Turning Tool is used on the front pulley.

⁽²⁾ This Tool is used in the aperture for the electric starting motor.

Start By:

- Remove the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install" for the correct procedure.
- Remove the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install" for the correct procedure.

NOTICE

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NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

Note: Either Tooling (A) can be used. Use the Tooling that is most suitable. Care must be taken in order to ensure that the fuel injection pump timing is not lost during the removal of the front gear group. Carefully follow the procedure in order to remove the gear group.

1. If the air compressor is equipped with a hydraulic pump, remove the hydraulic pump. Refer to Original Equipment Manufactures (OEM) for the correct procedure.
2. If the engine is equipped, with an air compressor remove the air compressor. Refer to Disassembly and Assembly, "Air Compressor - Remove" for the correct procedure.
3. If the engine is equipped with only a right-hand side hydraulic pump, remove the hydraulic pump. Refer to the OEM for the correct procedure.
4. Use Tooling (A) in order to rotate the crankshaft so that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.

Note: Do not use excessive force to install Tooling (D). Do not use Tooling (D) to hold the crankshaft during repairs.

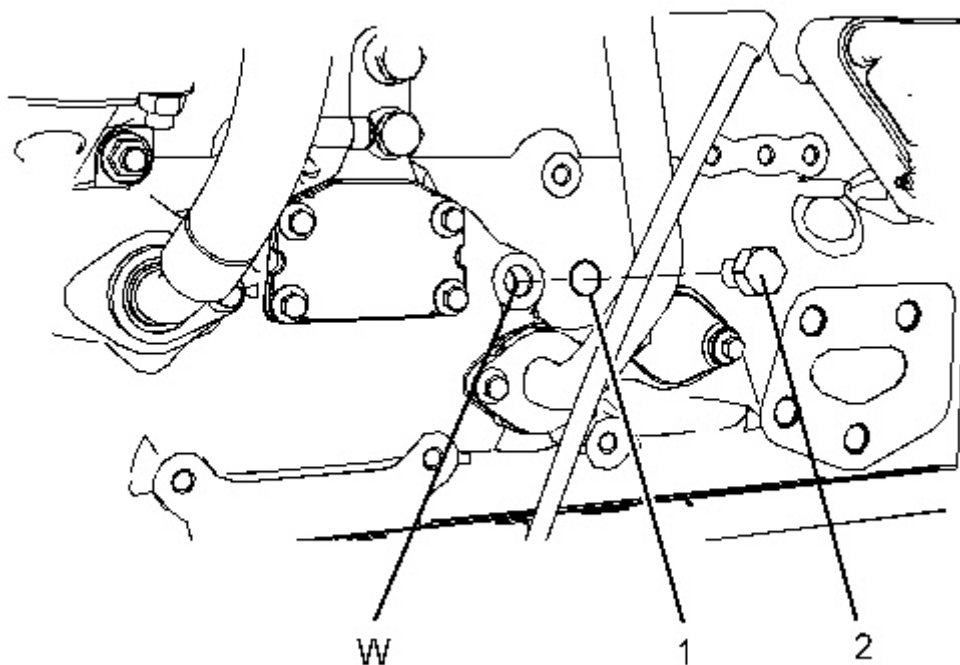


Illustration 1

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5. Remove plug (2) from the cylinder block. Remove O-ring seal (1) from the plug.
 6. Use Tooling (A) in order to rotate the crankshaft so that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure. Install Tooling (D) through Hole (W) in order to lock the crankshaft.
 7. Remove Tooling (D).
 8. Use Tooling (A) in order to rotate the crankshaft in a clockwise direction and position the crankshaft at 60 degrees after top dead center.
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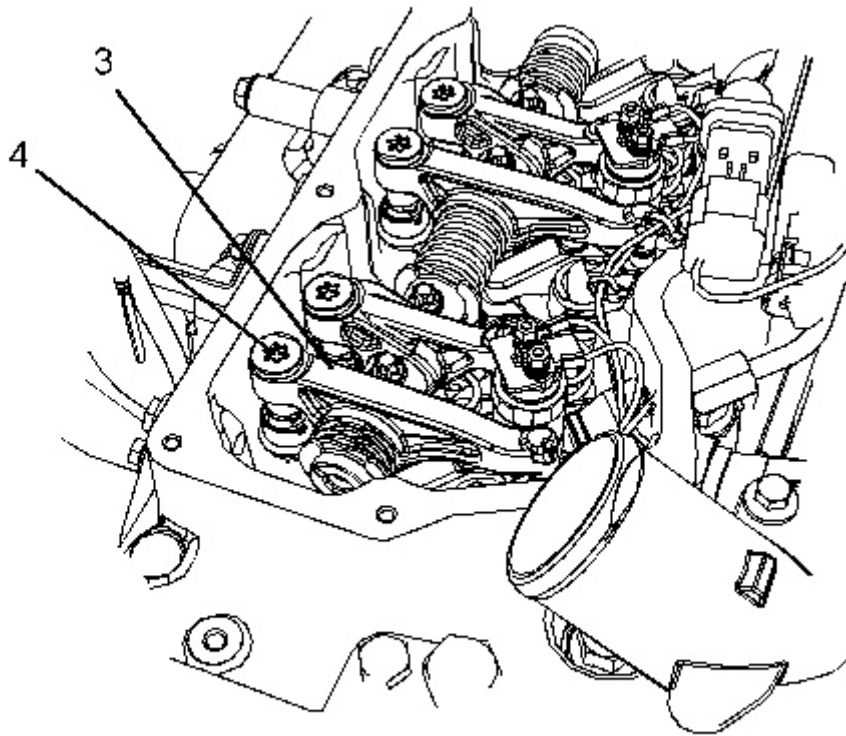


Illustration 2

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9. Use Tooling (E) in order to loosen threaded inserts (4) on all rocker arms (3). Unscrew threaded inserts (4) on all rocker arms (3) until all valves are fully closed.

Note: Ensure that ALL threaded inserts are fully unscrewed.

10. Use Tooling (A) in order to rotate the crankshaft so that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure. Install Tooling (D) through Hole (W) in order to lock the crankshaft. Refer to Illustration 1.
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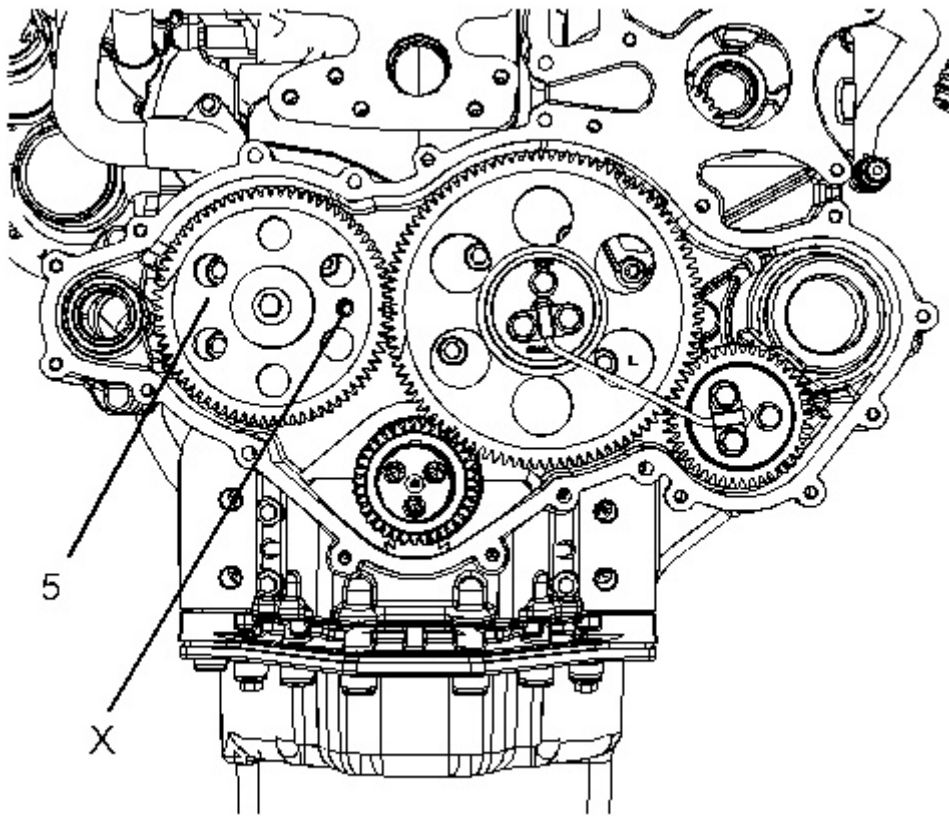


Illustration 3

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11. Install Tooling (B) through Hole (X) in camshaft gear (5) into the front housing. Use Tooling (B) in order to lock the camshaft in the correct position. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.
12. Use Tooling (C) in order to lock the fuel injection pump gear in the correct position. Refer to Disassembly and Assembly, "Fuel Injection Pump - Remove" for the correct procedure.

Note: The fuel injection pump must remain locked until the procedure instructs you to unlock the fuel injection pump.

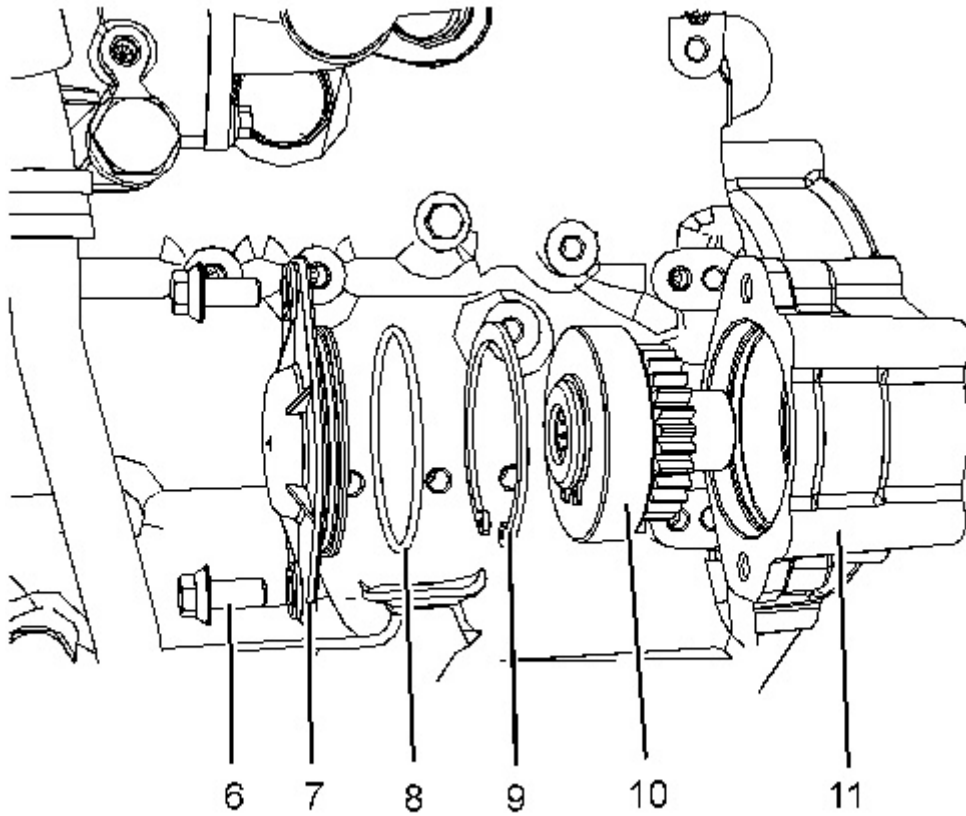


Illustration 4

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13. If the right-hand side of the engine is equipped, with a hydraulic pump remove the hydraulic pump. Refer to the OEM for the correct procedure.
 14. If necessary, remove bolts (6) from plate (7). Remove plate (7) and remove O-ring seal (8).
 15. Remove circlip (9) and remove gear assembly (10) from front housing (11).
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